

Toxic Stress and ACEs

Presented by:

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Acknowledgements

**Adapted from a presentation by Neil Boris, MD
and by his permission.**

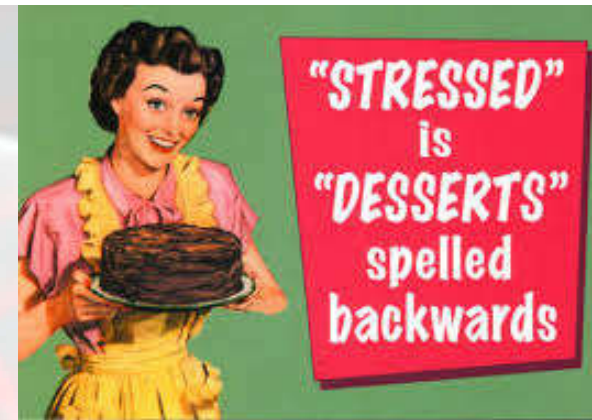


Objectives

- To be aware of toxic stresses**
- To illustrate the physiologic effects of stress**
- To understand the consequences of Adverse Childhood Experiences (ACEs)**
- To review the results of studies on ACEs**
- To facilitate interventions for individuals who have had ACEs**



What is Stress?



- Stress is a response to pressure or threat.
- Under stress, we may feel tense, nervous, or on edge. The stress response is physical, too.
- Stress triggers a surge of a hormone called adrenaline that temporarily affects the nervous system.
- As a result, when you're nervous or stressed you might feel your heartbeat or breathing get faster, your palms get sweaty, or your knees get shaky.

What is Stress?



Short-term stress:

- May last for minutes or hours
- Exams in school; giving a presentation; in a sporting competition

-Long-term stress:

- May last days, weeks, or longer
- Pregnancy, divorce, moving to a new school



Physiology of Stress Response

Faster HR & lower HRV

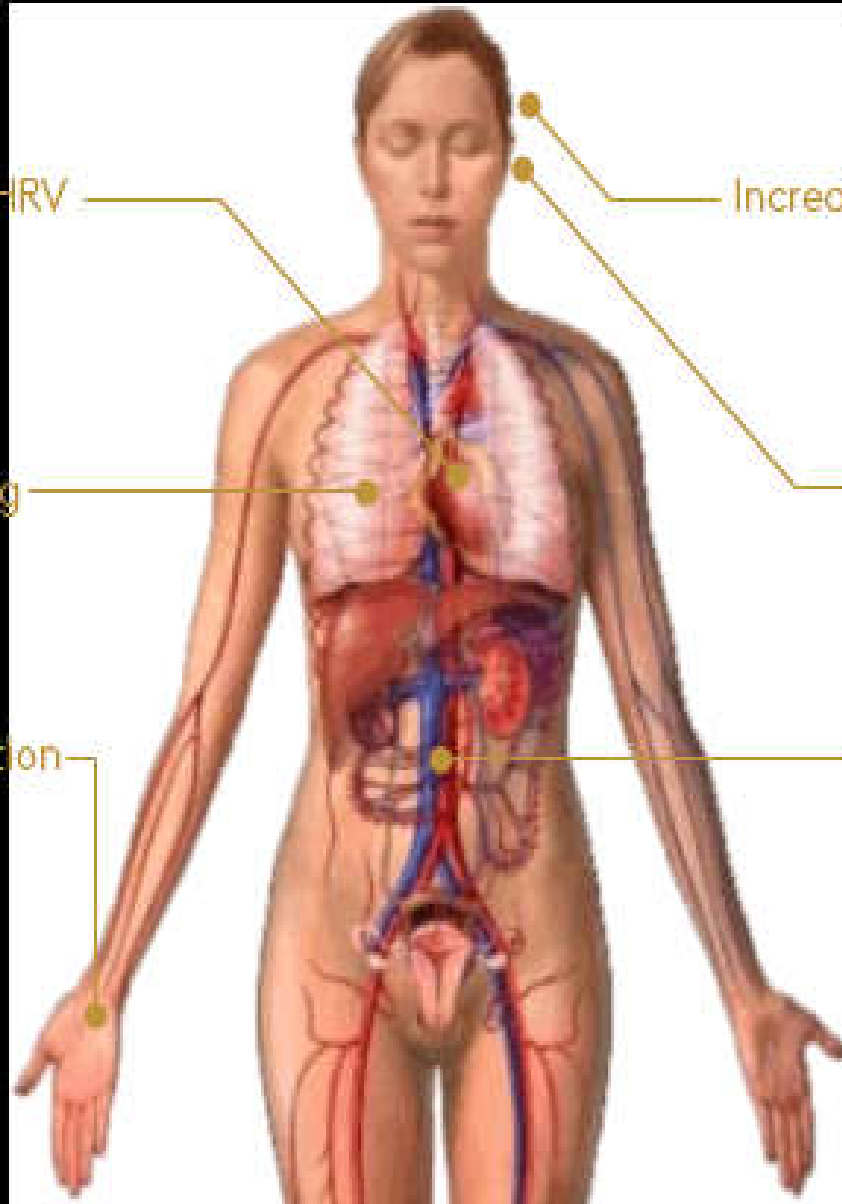
Increased blood flow to brain

Increased breathing

Dilated pupils

Increased perspiration

Inhibited digestion



Let's Start with a Case...



- ❑ 4.5 year old boy
- ❑ Chief Complaint: “he’s all over the place”; “doesn’t listen;” “can’t focus.”
- ❑ Fights, hits and curses others; withdrawn from Head Start because of aggressive behavior
- ❑ In Pre-K was expelled and his Grandmother (and primary caretaker) had to leave work

Brief History...

I WANT YOU TO KNOW,
AND KNOW THAT IT'S TRUE,
THAT YOU MAY BE STRESSED,
BUT KIDS HAVE STRESS TOO.

- D. came to an Early Childhood Program at almost 4.5 years old
- At 24 months, D. had sustained liver laceration, ruptured spleen, fractured ribs after being kicked by Mom's BF
- Child protective services placed him with GM and Mom was told "You can't care for him."
- Mom's then BF sentenced to jail term

Do you think that D. has suffered any stress?

Stresses.....



POSITIVE

Brief increases in heart rate,
mild elevations in stress hormone levels.

TOLERABLE

Serious, temporary stress responses,
buffered by supportive relationships.

TOXIC

Prolonged activation of stress
response systems in the absence
of protective relationships.

Types of stress responses

POSITIVE



A normal and essential part of healthy development

EXAMPLES

*getting a vaccine,
first day of school*

TOLERABLE



Response to a more severe stressor, limited in duration

EXAMPLES

*loss of a loved one,
a broken bone*

TOXIC



Experiencing strong, frequent, and/or prolonged adversity

EXAMPLES

*physical or emotional abuse,
exposure to violence*

STRESS IN CHILDHOOD

Three Types

Stress is a mental, physical, or biochemical response to a perceived threat or demand. Stress is a natural and inevitable part of childhood. But the *type of stress* can make a difference in the impact on a child's brain and body, as well as potential effects that can last a lifetime.

POSITIVE STRESS

Normal, typical childhood experiences

Common Stressors

Child care drop off and pick up



Playground injuries



Losing a game



Buffering

No buffering support necessary



Brain & Body

Temporary, mild elevation in stress hormones



Brief increase in heart rate and blood pressure



Long-term

Increased resiliency and confidence



Coping skills development



TOLERABLE STRESS

More complicated, scary, challenging, and long-lasting

Common Stressors



Natural or manmade tragedy

Parents' divorce

Poverty

Death of a loved one



Buffering



Caring adult buffers stress

Brain & Body

More severe, continuing cardiovascular and hormonal response



Long-term



Adaption and recovery likely, but potential for lasting physical or emotional damage



TOXIC STRESS

Severe, long-lasting, uncontrollable, and/or frequent stress

Common Stressors

Physical, sexual, or mental abuse



Neglect

Exposure to violence



Severe economic hardship



Buffering



No adult buffers child from stress

Brain & Body



Prolonged activation of stress response system

Disrupted development of brain circuits

Immune system depression



Long-term

Possible lifelong changes, such as:



Heart disease

Alcoholism

Memory, learning, multitasking difficulties

Anxiety/depression

Cancer



Sources:

<http://www.nlm.nih.gov/health/publications/stress/index.shtml>

http://developingchild.harvard.edu/topics/science_of_early_childhood/toxic_stress_response

http://www.cdc.gov/ncipc/pub-res/pdf/childhood_stress.pdf

http://developingchild.harvard.edu/resources/reports_and_working_papers/working_papers/wp3

BODY

headaches
frequent infections
taut muscles
muscular twitches
fatigue
skin irritations
breathlessness

MIND

worrying
muddled thinking
impaired judgement
nightmares
indecisions
negativity
hasty decisions

STRESS

loss of confidence
more fussy
irritability

depression
apathy

alienation
apprehension

accident prone
loss of appetite
loss of sex drive
drinking more
insomnia

restlessness

smoking more

EMOTIONS

BEHAVIOR

Toxic Stress Changes Brain Architecture

Normal



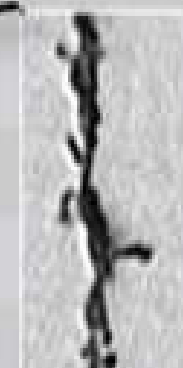
Typical
neuron with many
connections



Toxic
Stress



Neuron damaged by
toxic stress --
fewer connections



AAP: Focus on “Toxic Stress”

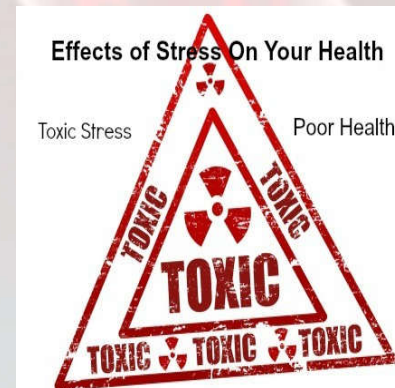
- ❑ January 2012 issue of Pediatrics, the American Academy of Pediatrics (AAP) called on "the entire pediatric community...to catalyze fundamental change in early childhood policy and services."
- ❑ “Greater focus on those interventions and community investments that reduce external threats to healthy brain growth.”



What ARE “external threats to healthy brain growth?”

- ❑ Repeated adverse experiences, such as child abuse or neglect, parental substance abuse, and maternal depression -- that cause strong, frequent, or prolonged activation of the body’s stress response systems in the absence of the buffering protection of a supportive, adult relationship =>

TOXIC STRESS



What are
ACEs?

(ADVERSE CHILDHOOD EXPERIENCES)



This talk will...

- ❑ Consider “toxic stress” as a medical and public health problem:
 - Adverse Childhood Experiences Study
 - Causal pathways to organ dysfunction
- ❑ With implications for:
 - Pediatric practice patient care
 - Community engagement

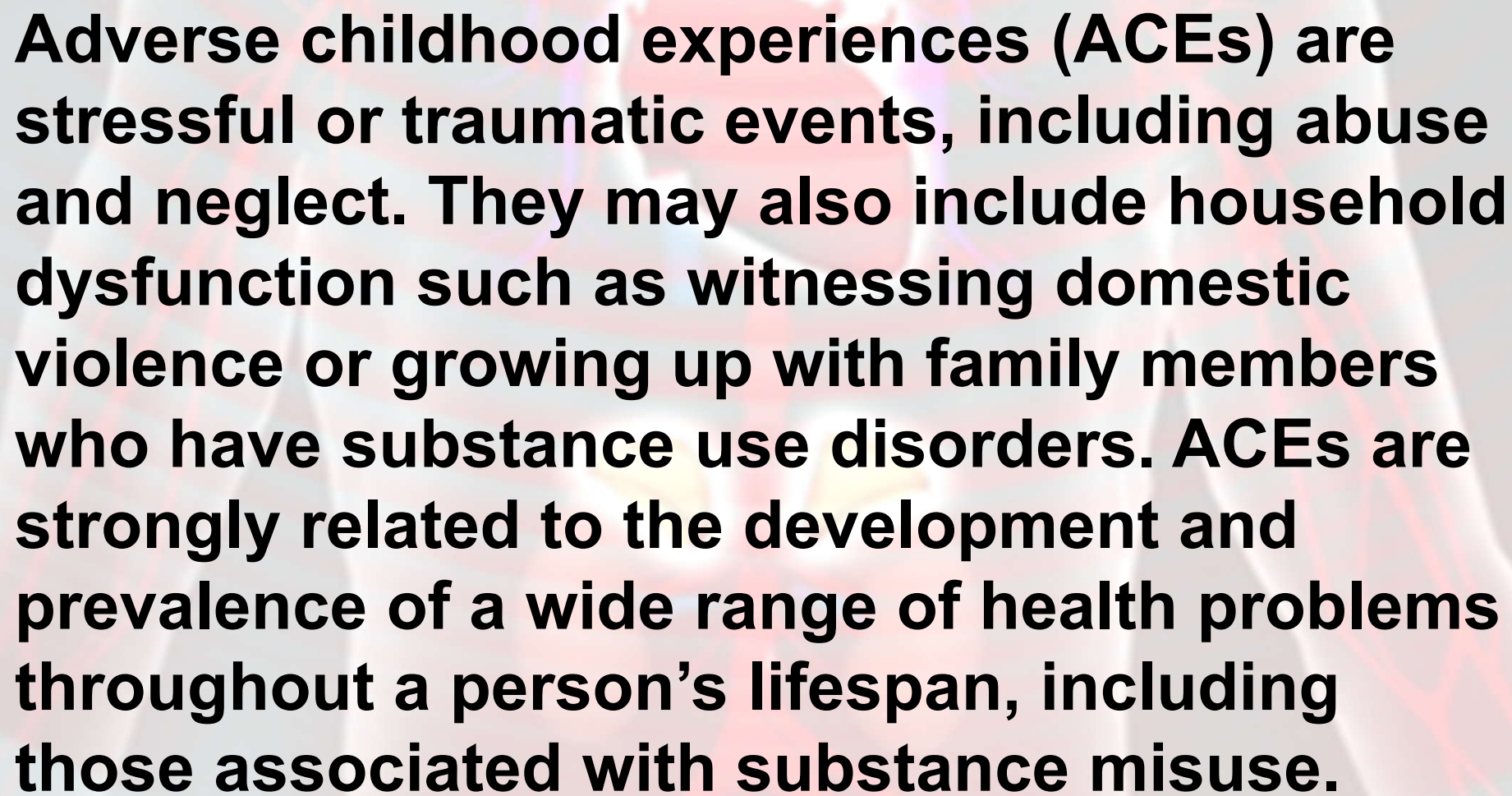
TOXIC STRESS

— AS A CHILD EXPERIENCES ACES OVER AND OVER AGAIN, HIS OR HER TOXIC STRESS LEVEL CONTINUES TO RISE. —

IS CAUSED BY

ADVERSE CHILDHOOD EXPERIENCES

— FOSTERING FUTURES —



<https://www.samhsa.gov/capt/practicing-effective-prevention/prevention-behavioral-health/adverse-childhood-experiences>

Three Types of ACEs

ABUSE



Physical



Emotional



Sexual

NEGLECT



Physical

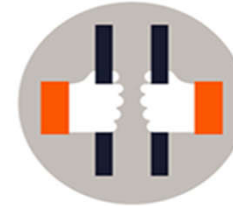


Emotional

HOUSEHOLD DYSFUNCTION



Mental Illness



Incarcerated Relative



Mother treated violently



Substance Abuse



Divorce

**There are MONSTERS
everywhere...**



**Prolonged Activation
of the Stress
Response System**



“The buffering protection of a supportive adult relationship” (?)



**A
Temporary
Fix!**

ACE's in America

- ❑ The term “Toxic Stress” was coined because of the broad-reaching impact of the Adverse Childhood Experiences studies which began in the 1990's...
- ❑ “It's the most important opportunity for the prevention of health and social problems and disease and disability that has ever been seen.”

- Vincent Felitti, MD



The ACE's Study

- ❑ The largest study of its kind ever done to examine the health and social effects of adverse childhood experiences over the lifespan. (~17,500 participants)
- ❑ Conducted by a group at Kaiser Permanente led by Vincent J. Felitti, M.D.



**KAISER
PERMANENTE®**

Study Demographics

- ❑ Study ran from 1995-1997
- ❑ Middle class sample (HMO participants)
- ❑ ~75% white, broad age range (median mid- 50's)
- ❑ Majority with some college education
- ❑ Participants received physical exams and surveys regarding childhood experiences and current health status and behaviors

Adverse Childhood Experiences (ACE) Study

- Dr Vincent Felitti
- Chief of Preventive Medicine at Kaiser Permanente
- Obesity Clinic 1985
- CDC
- [Short Video Introduction to ACE Study](#)



Original Study: Categories of Adverse Childhood Experiences

Abuse by Category

Psychological (by parent)

Physical (by parent)

Sexual (by anyone)

Adverse Childhood Experiences Rarely
Occur in Isolation...

They come in **groups**.

Household Dysfunction by Category

Substance Abuse Mental Illness

Mother Treated Violently

Imprisoned Household Member

Categories of Adverse Childhood Experiences



Abuse by Category

Prevalence of positive response

Psychological (by parent)	11%
Physical (by parent)	11%
Sexual (by anyone)	22%

Household Dysfunction by Category

Substance Abuse	26%
Mental Illness	19%
Mother Treated Violently	13%
Imprisoned Household Member	3%

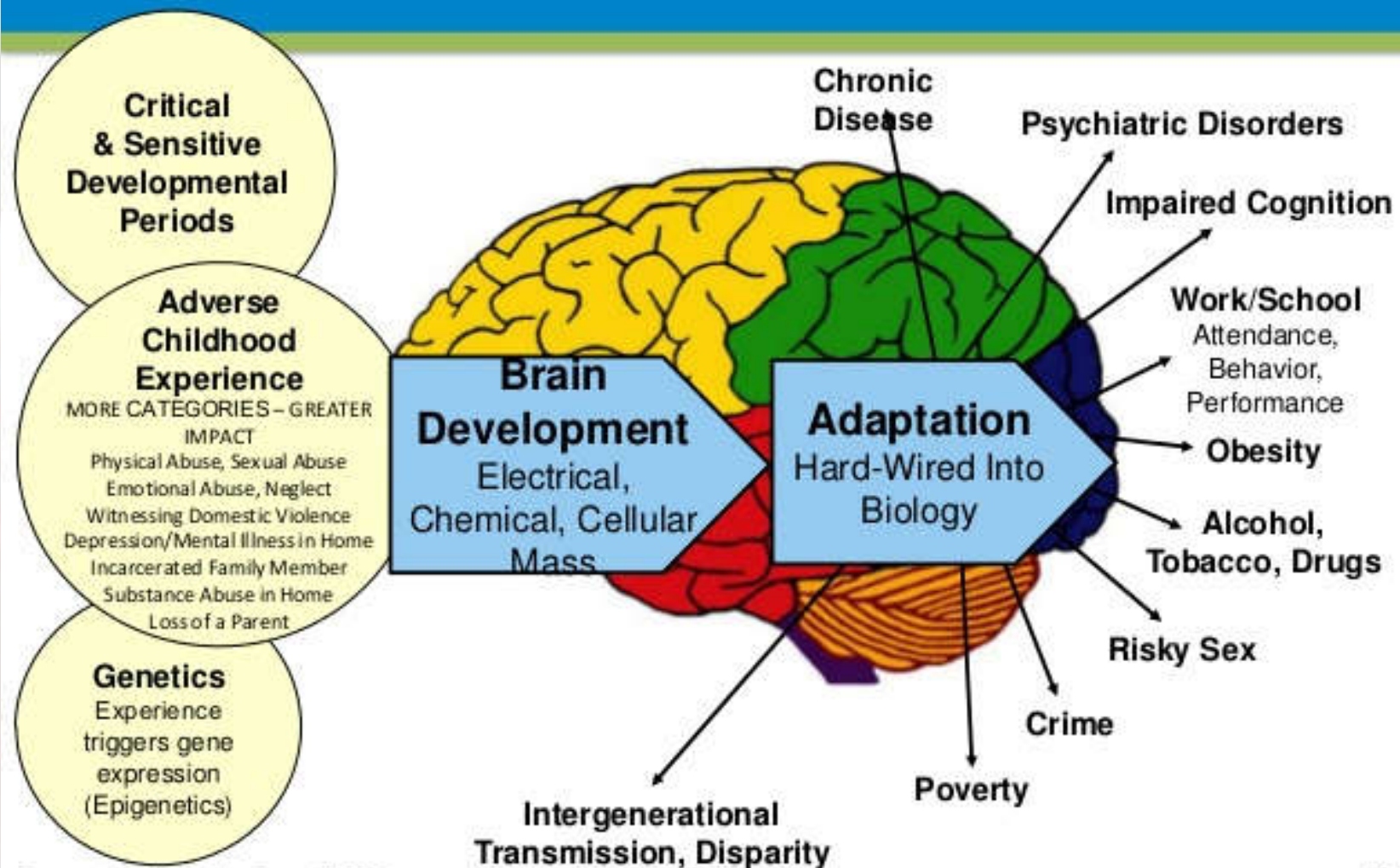
List of Health Indicators

Many chronic diseases
of adults are determined
decades earlier, in childhood.

Not by disease, but by life experiences.

- Smoking
- Severe Obesity
- Physical Inactivity
- Depression
- Suicide Attempt
- COPD
- Fetal/Infant Death
- Liver Disease
- Cancer
- Alcoholism/abuse
- Illicit Drug Use
- Injected Drug Use
- 5+ Sexual Partners
- History of STDs
- Unintended pregnancy
- Ischemic Heart Dz
- Intimate Partner Violence

Lifespan Impacts of ACEs



Source: Family Policy Council, 2012

Research Question

- How does exposure to adverse childhood experiences relate to all these major health indicators?



ACEs Increase Health Risks

BEHAVIOR



Lack of physical activity



Smoking



Alcoholism



Drug use



Missed work

PHYSICAL & MENTAL HEALTH



Severe obesity



Diabetes



Depression



Suicide attempts



STDs



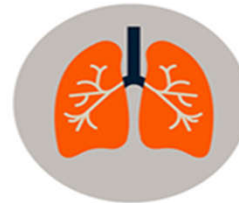
Heart disease



Cancer



Stroke



COPD



Broken bones

ACE Score Distribution

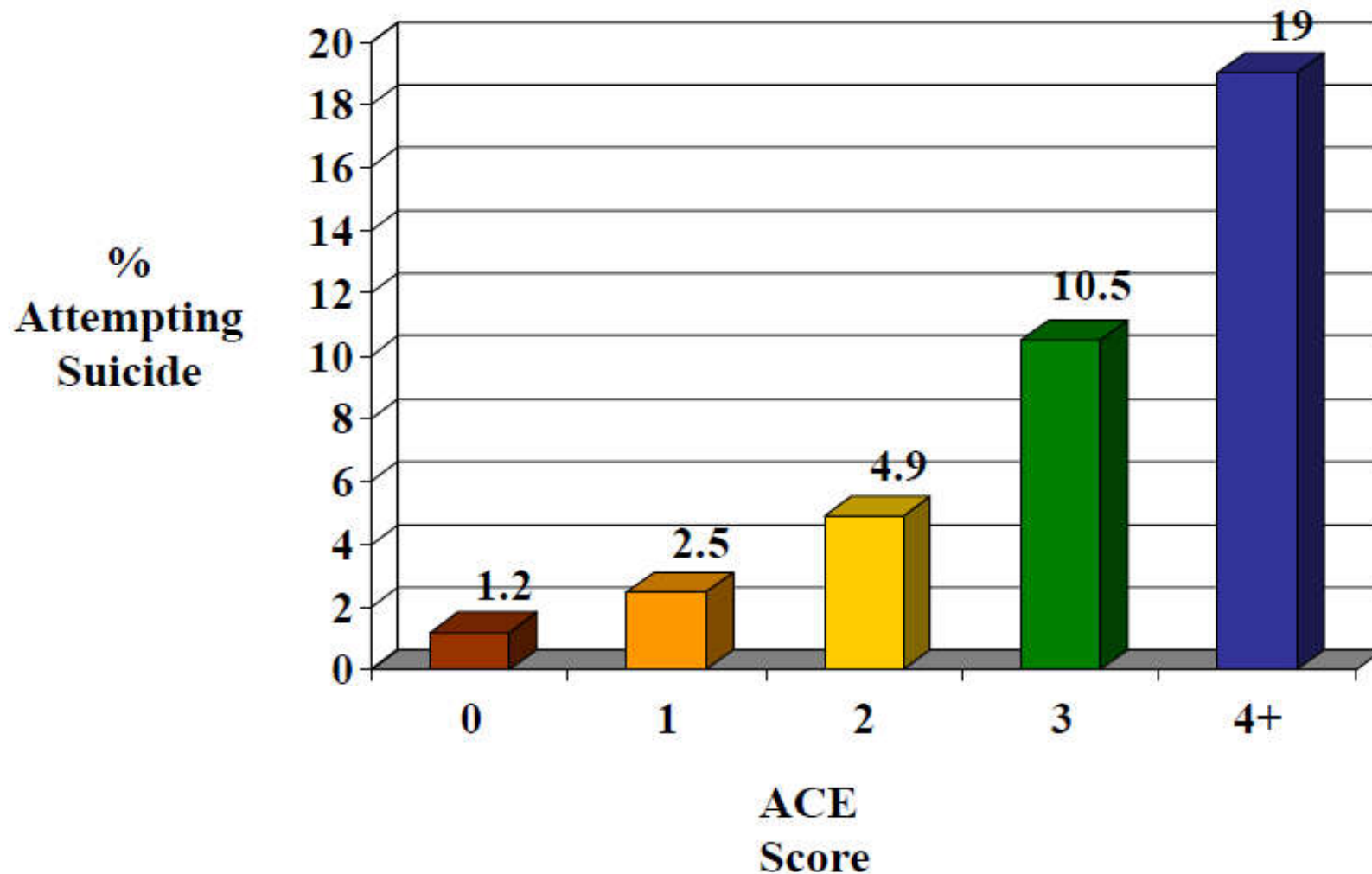
- 1/3rd of adults have an ACE score of ZERO
- Majority of those adults have very few risk factors for disease
- 2/3rds of adults of at least one ACE
- As the ACE score increases, so does disease risk

ACE Score & Risk for Chronic Disease

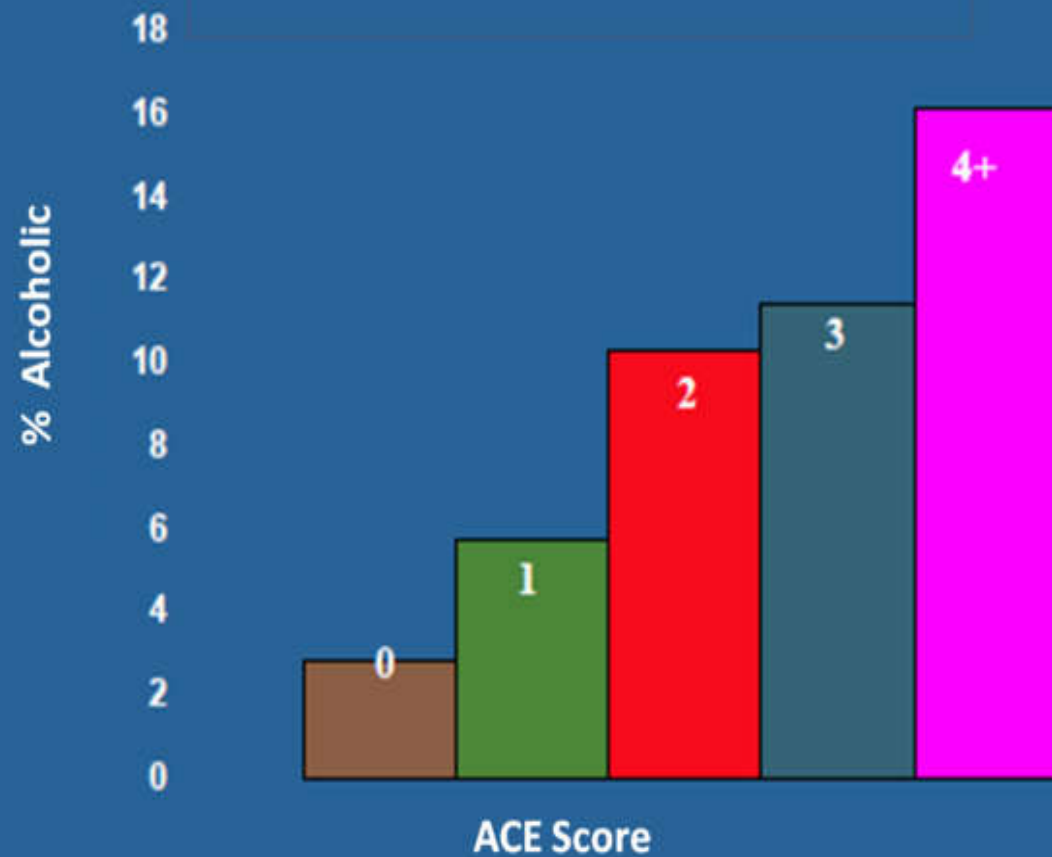


Disease risk increases with ACE scores, Felitti et al, 1998

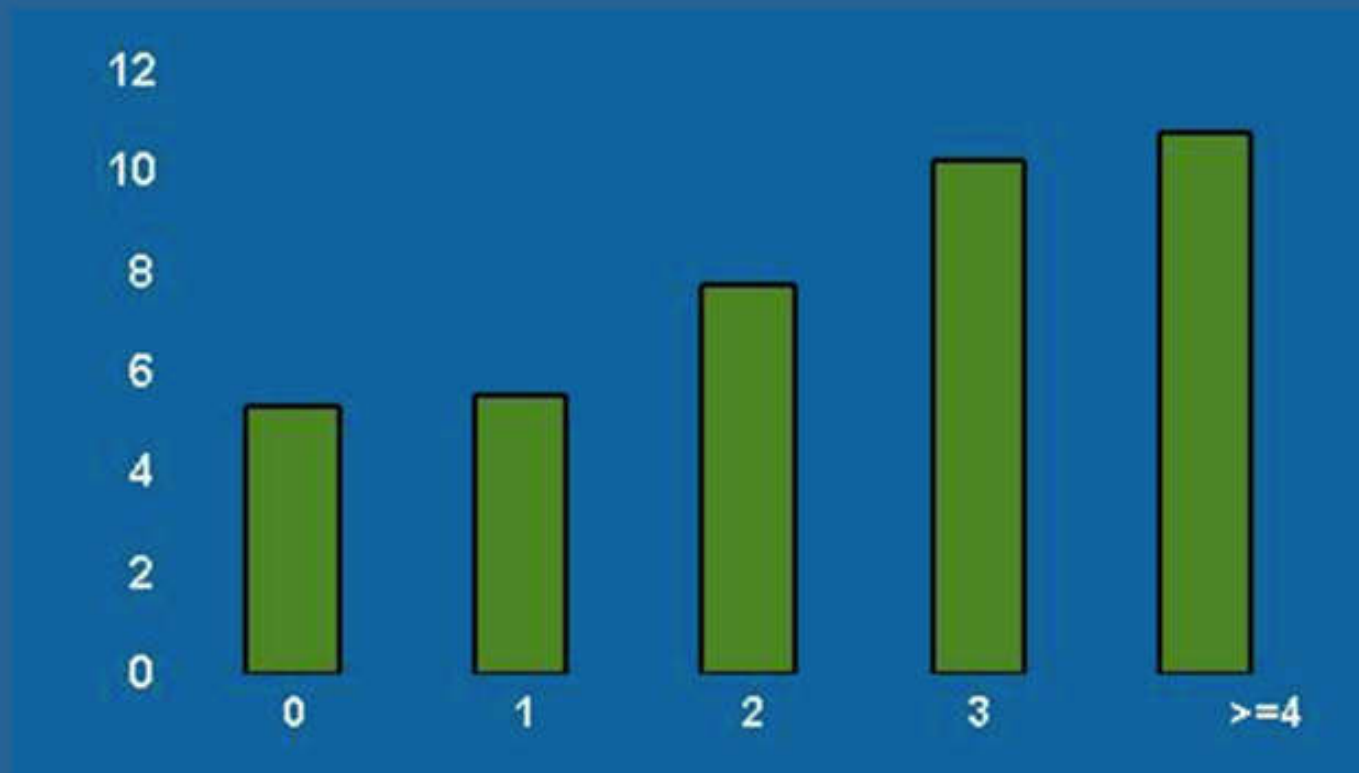
Adverse Childhood Experiences and Suicide



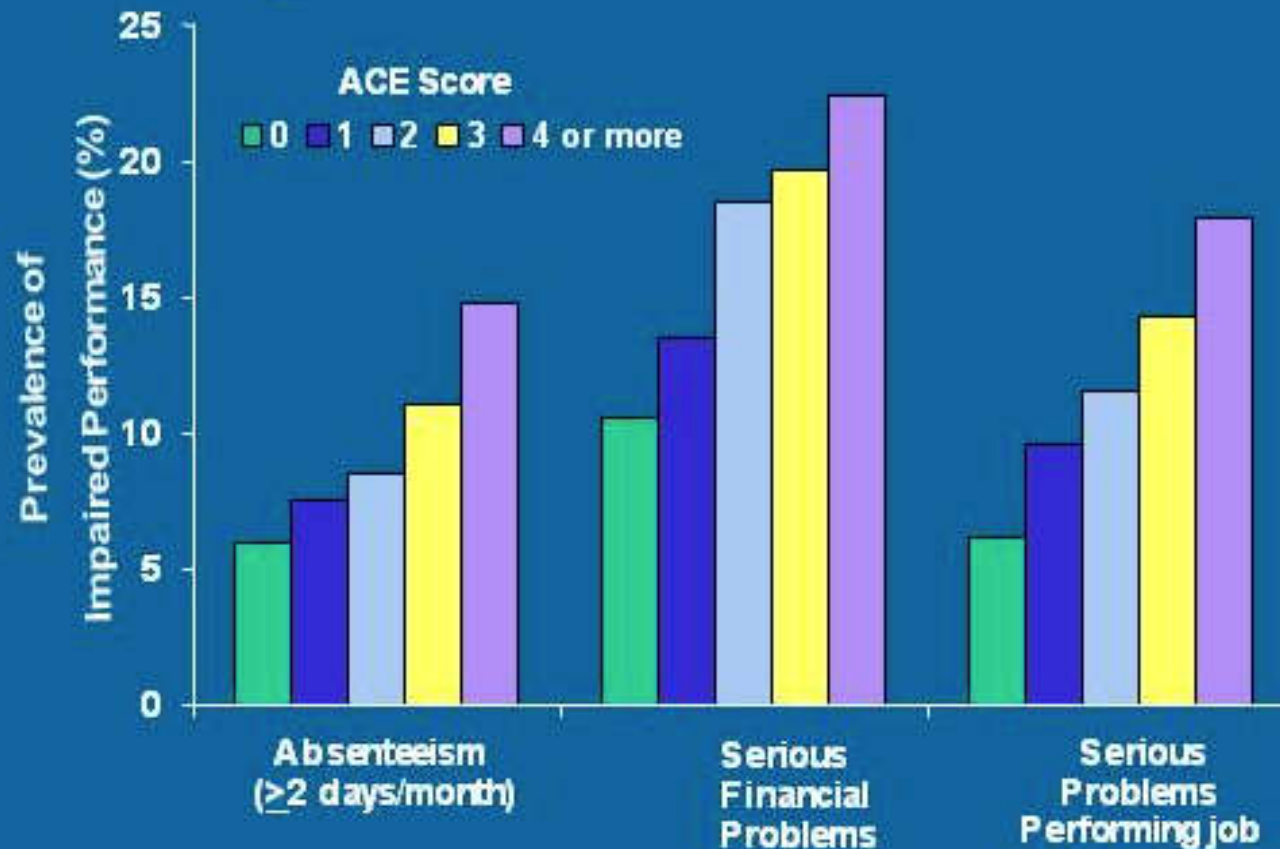
Childhood Experiences vs. Adult Alcoholism



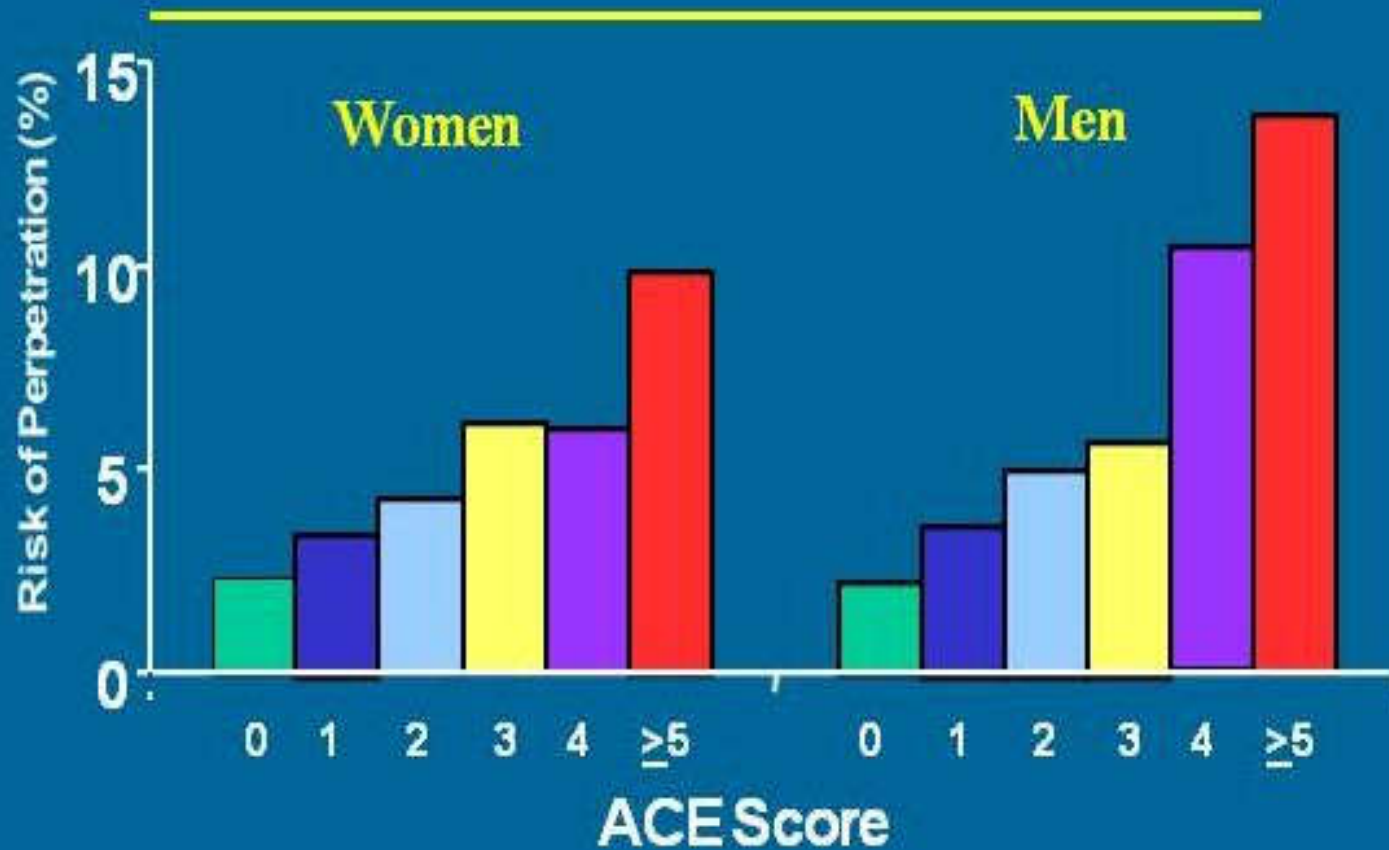
ACE Score and the Prevalence of Liver Disease (Hepatitis/Jaundice)



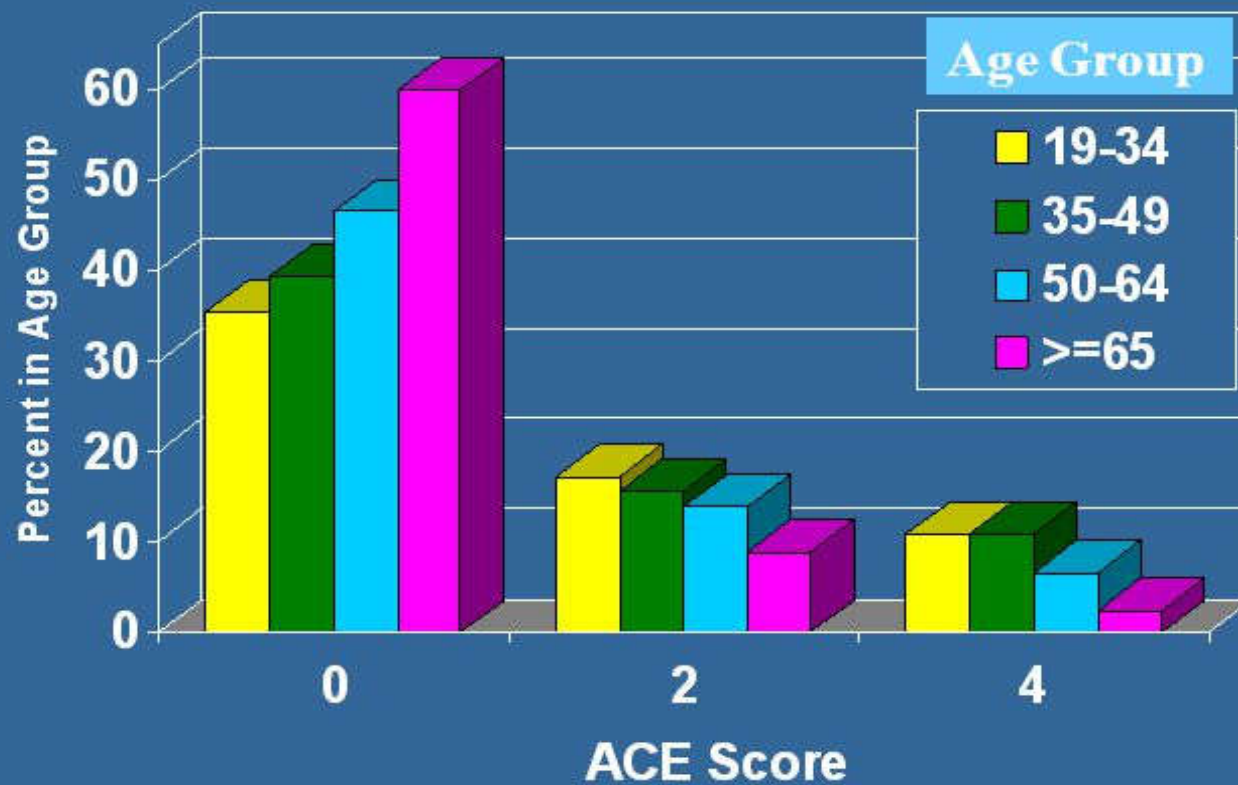
ACE Score and Indicators of Impaired Worker Performance



ACE Score and the Risk of *Perpetrating* Domestic Violence



Effect of ACEs on Mortality



0 ACE 60% live to 65

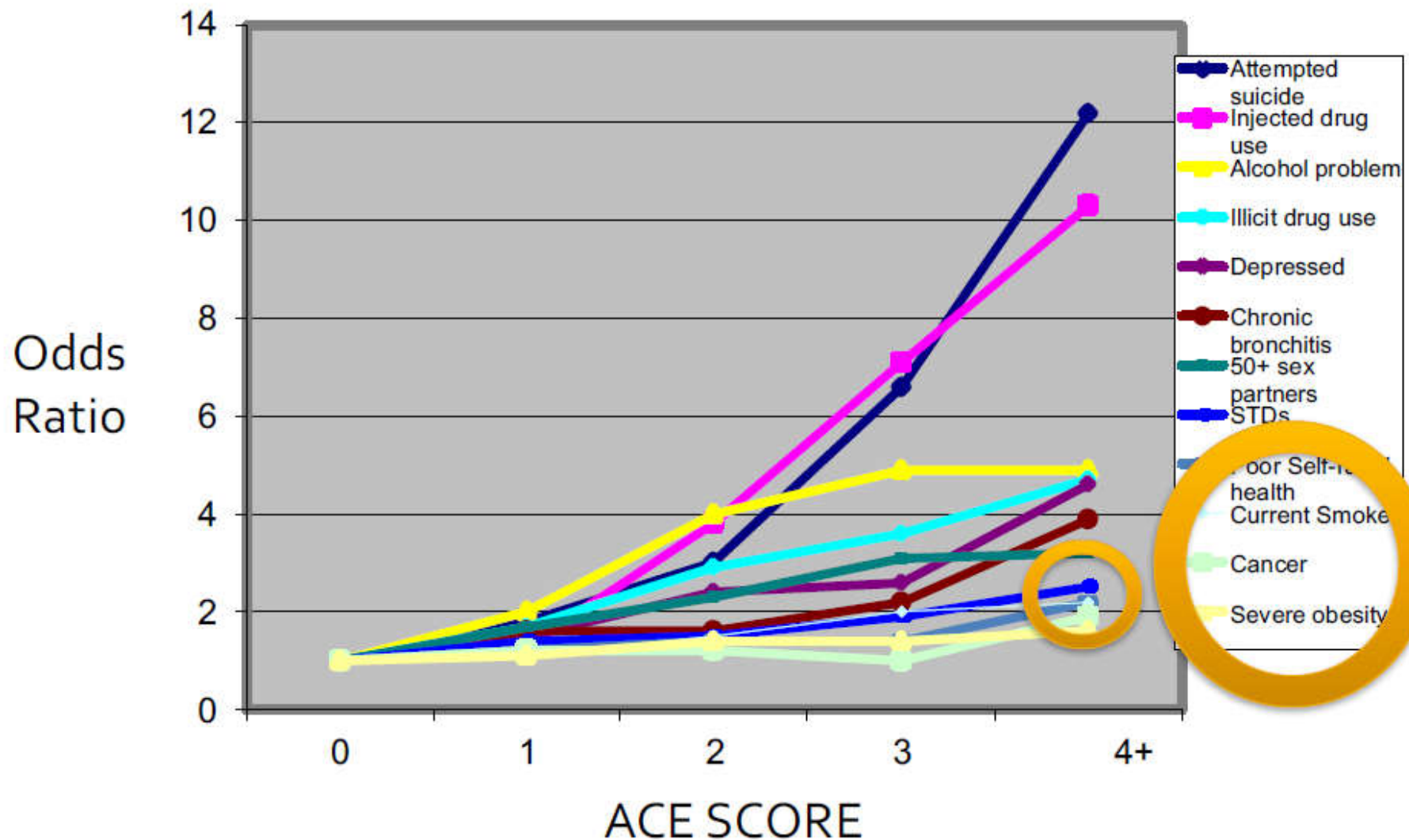
4 ACE less than 3% live to 65

ACE Score Distribution

- If any one ACE present, there was 87% chance of a 2nd, and 50% chance of 3 others (e.g., ACE > 4)
 - In other words, ACE's “cluster”
 - Women 50% more likely than men to have ACE score >5
- “Dose Response Relationship”
- Are ACEs synergistic?



Cumulative ACEs Increase the Risk of Negative Outcomes



Probability of Sample Outcomes Given 100 Americans

Average Life Span is Twenty Years Less

33
Report No ACEs



WITH 0 ACEs

1 in 16 smokes
1 in 69 are alcoholic
1 in 480 uses IV drugs
1 in 14 has heart disease
1 in 96 attempts suicide

51
Report 1-3 ACEs



WITH 3 ACEs

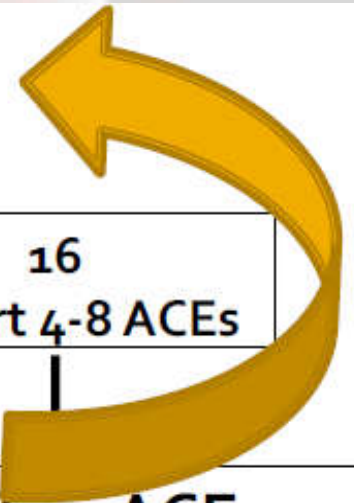
1 in 9 smokes
1 in 9 are alcoholic
1 in 43 uses IV drugs
1 in 7 has heart disease
1 in 10 attempts suicide

16
Report 4-8 ACEs



WITH 7+ ACEs

1 in 6 smokes
1 in 6 are alcoholic
1 in 30 use IV drugs
1 in 6 has heart disease
1 in 5 attempts suicide



ACE Study Implications

- **Epidemiologic data: In the developed world, ACE's may be the most important health risk indicator:**
 - Tied to early developmental problems AND adult health
 - Economically MASSIVE impact
- **Causal mechanisms increasingly established**
 - ACE's cause physiological change that cause health problems


$$1 + 1 = 2$$

Consider 2 Primary Implications

- **Pediatric/Family Practice**
- **Community-based Early Intervention**



What About Pediatric/Family Practice?

- **“We’re trying to emphasize that much more important than just listening to a baby’s heart is listening to a baby’s brain,”**
 - **Robert W. Block, M.D., of Tulsa, Okla., past president of AAP**
- 1. Assessing Parent-Child Interactions**
- 2. Uncovering Family Stressors**



Dr. Nadine Burke Harris

Redefining a “Well Child Visit”

- **Good News:** 96.4% of children are seen by a primary care provider in the first 4 years...
- **Bad News:** Few providers have “thrown their training out the window”...and fewer still have the appropriate incentives to do so!



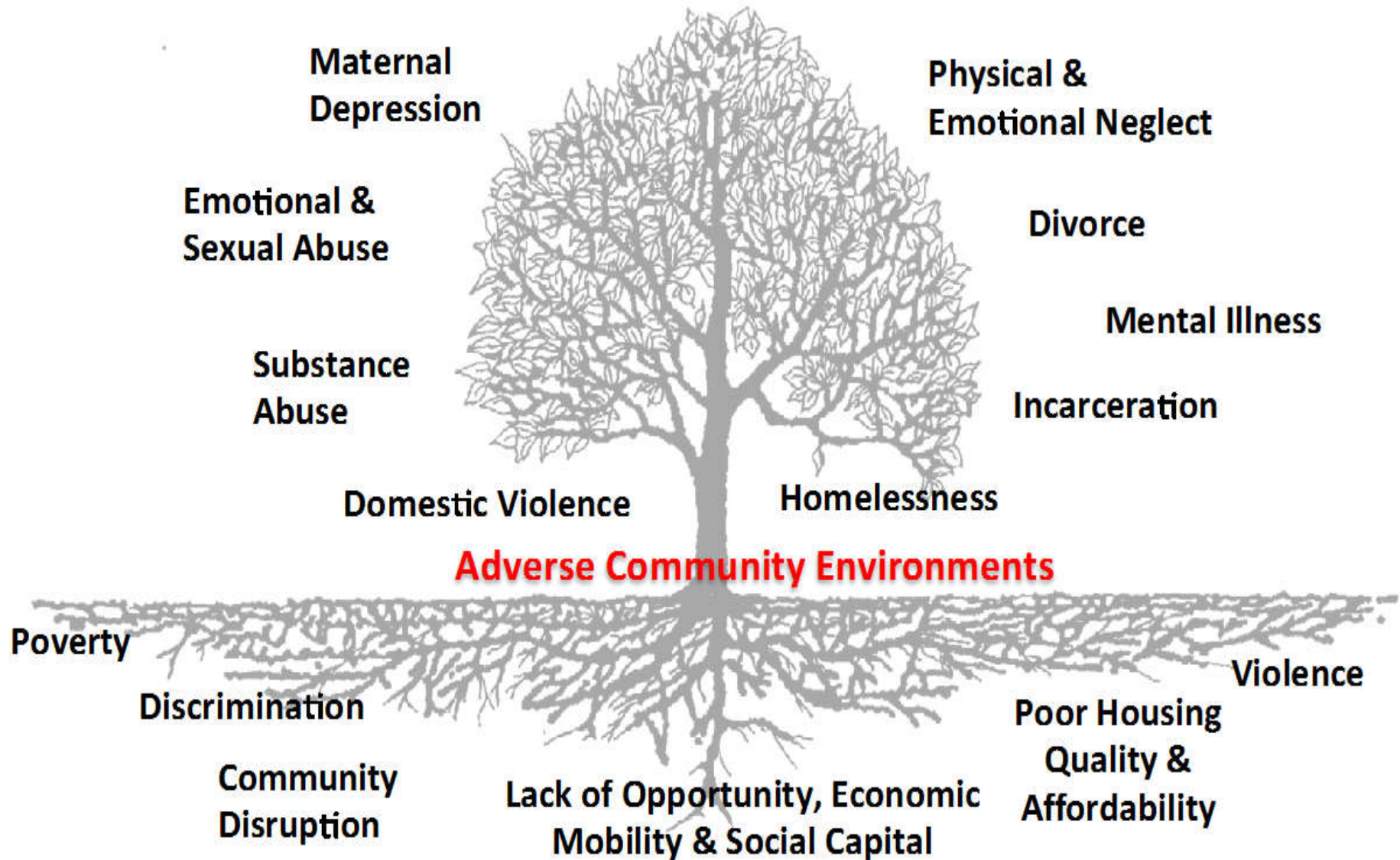
Starting Every Check Up...

- **“Since the last time I saw you (your child) has anything really scary or upsetting happened to you (your child) or anyone in your family?”**
- **Screen for family violence, maternal depression, child stress**



The Pair of ACEs

Adverse Childhood Experiences



CYW Adverse Childhood Experiences Questionnaire (ACE-Q) Child

To be completed by Parent/Caregiver

Today's Date: _____

Child's Name: _____ Date of birth: _____

Your Name: _____ Relationship to Child: _____

Many children experience stressful life events that can affect their health and wellbeing. The results from this questionnaire will assist your child's doctor in assessing their health and determining guidance. Please read the statements below. Count the number of statements that apply to your child and write the total number on the line provided.

Please DO NOT mark or indicate which specific statements apply to your child.

1) Of the statements in Section 1, HOW MANY apply to your child? Write the total number in the box.

Section 1. *At any point since your child was born...*

- Your child's parents or guardians were separated or divorced
- Your child lived with a household member who served time in jail or prison
- Your child lived with a household member who was depressed, mentally ill or attempted suicide
- Your child saw or heard household members hurt or threaten to hurt each other
- A household member swore at, insulted, humiliated, or put down your child in a way that scared your child OR a household member acted in a way that made your child afraid that s/he might be physically hurt
- Someone touched your child's private parts or asked your child to touch their private parts in a sexual way
- More than once, your child went without food, clothing, a place to live, or had no one to protect her/him
- Someone pushed, grabbed, slapped or threw something at your child OR your child was hit so hard that your child was injured or had marks
- Your child lived with someone who had a problem with drinking or using drugs
- Your child often felt unsupported, unloved and/or unprotected

2) Of the statements in Section 2, HOW MANY apply to your child? Write the total number in the box.

Section 2. *At any point since your child was born...*

- Your child was in foster care
- Your child experienced harassment or bullying at school
- Your child lived with a parent or guardian who died
- Your child was separated from her/his primary caregiver through deportation or immigration
- Your child had a serious medical procedure or life threatening illness
- Your child often saw or heard violence in the neighborhood or in her/his school neighborhood
- Your child was often treated badly because of race, sexual orientation, place of birth, disability or religion

CYW Adverse Childhood Experiences Questionnaire Teen (ACE-Q) Teen

To be completed by Parent/Caregiver

Today's Date: _____

Child's Name: _____ Date of birth: _____

Your Name: _____ Relationship to Child: _____

Many children experience stressful life events that can affect their health and wellbeing. The results from this questionnaire will assist your child's doctor in assessing their health and determining guidance. Please read the statements below. Count the number of statements that apply to your child and write the total number on the line provided.

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- ☐ Your child lived with a household member who was depressed, mentally ill or attempted suicide
- ☐ Your child saw or heard household members hurt or threaten to hurt each other
- ☐ A household member swore at, insulted, humiliated, or put down your child in a way that scared your child OR a household member acted in a way that made your child afraid that s/he might be physically hurt
- ☐ Someone touched your child's private parts or asked them to touch that person's private parts in a sexual way that was unwanted, against your child's will, or made your child feel uncomfortable
- ☐ More than once, your child went without food, clothing, a place to live, or had no one to protect her/him

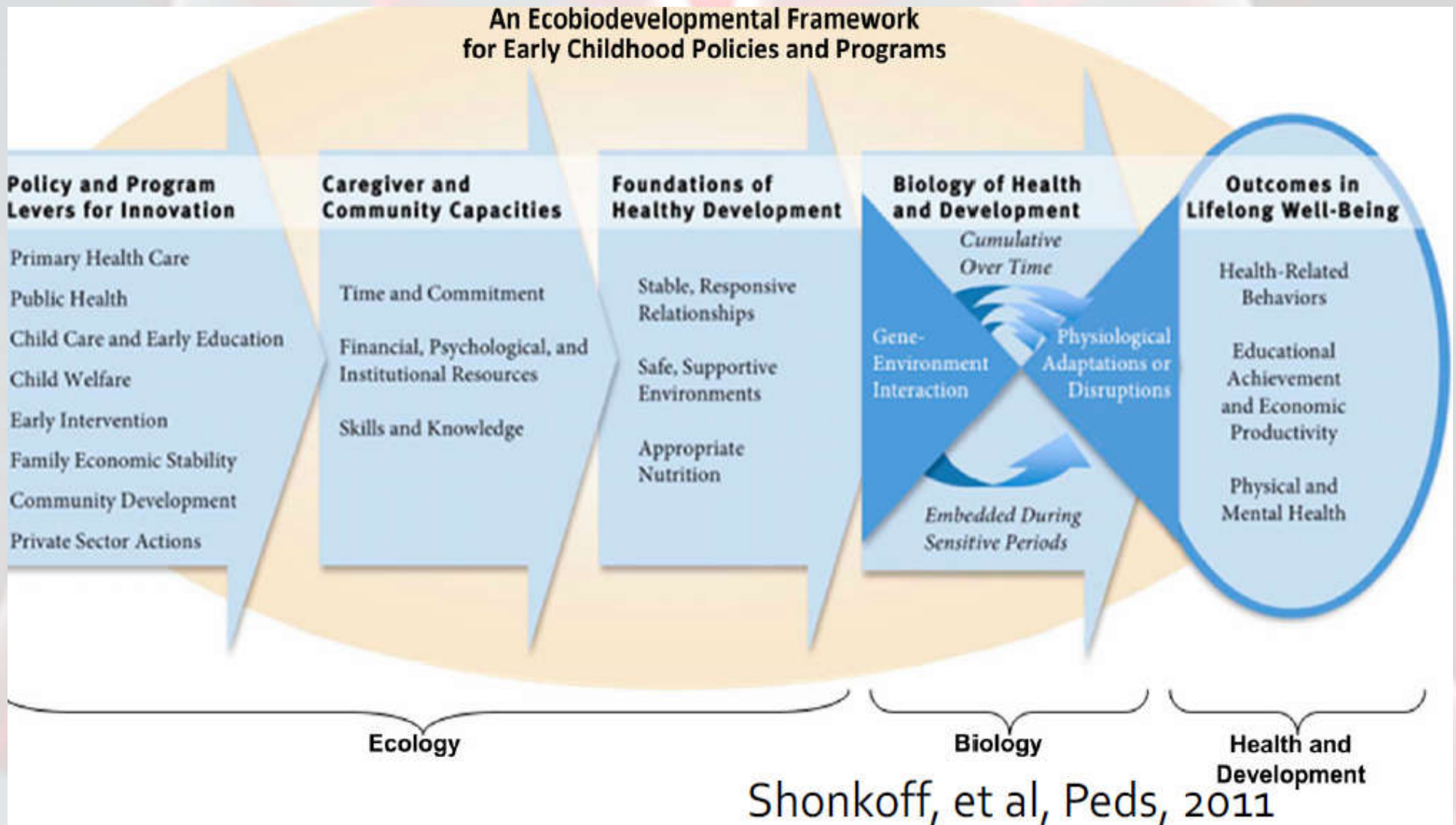
- ☐ Someone pushed, grabbed, slapped or threw something at your child OR your child was hit so hard that your child was injured or had marks
- ☐ Your child lived with someone who had a problem with drinking or using drugs
- ☐ Your child often felt unsupported, unloved and/or unprotected

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- ☐ Your child was separated from her/him primary caregiver through deportation or immigration
- ☐ Your child had a serious medical procedure or life threatening illness
- ☐ Your child often saw or heard violence in the neighborhood or in her/his school neighborhood
- ☐ Your child was detained, arrested or incarcerated
- ☐ Your child was often treated badly because of race, sexual orientation, place of birth, disability or religion
- ☐ Your child experienced verbal or physical abuse or threats from a romantic partner (i.e. boyfriend or girlfriend)

Toward A Policy Framework



We DO Need to Change Practice...

- **How do we push primary care practice to evolve such that identifying toxic stress in early childhood becomes a primary goal?**
- **Can we make medical and residency education focus on the “new morbidities” rather than “traditional” diseases?**
- **How do we support integrating trauma-based interventions into our communities?**



August 2017 FMA Resolution Trauma-Informed Care Learning Communities

Whereas, An estimated 60 percent of adults in the United States have experienced an adverse life experience (trauma) at least once in their lives; and

Whereas, The prevalence of Adverse Childhood Experiences (ACEs) is evident in every Florida school and classroom; and

Whereas, Twenty-six percent of children in the United States will witness or be involved in a traumatic experience before they turn four years old, and four of every ten children in America say they experienced a physical assault during the past year, with one in 10 receiving an assault-related injury; and

Whereas, More than 60 percent of youth age 17 and younger have been exposed to crime, violence, and abuse either directly or indirectly; and

Whereas, When unaddressed, people who have experienced trauma can face poor health outcomes, such as exacerbated mental health problems and increased risk of heart disease, suicide, substance abuse, and premature death including increased fetal and infant mortality rates; and

Whereas, Traumatic experiences also greatly affect a child's journey through school. A child impacted by trauma may experience physical ailments, intrusive thoughts and fears, and decreased attention and concentration, all which impact learning. Students with trauma histories may exhibit aggression and anger, strive for perfection, or quietly disengage, all which may affect the ability to form relationships; and

Whereas, The Florida Department of Children and Families is committed to becoming a trauma-informed organization; and

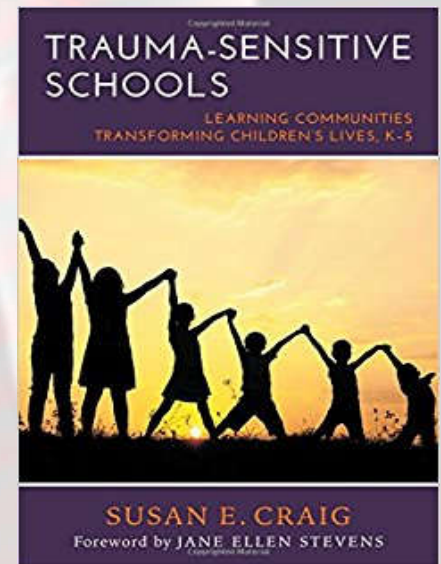
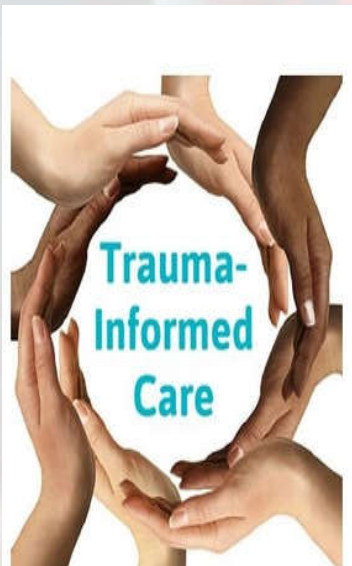
Whereas, Some communities in Florida including the City of [Tarpon Springs](#), and [Alachua](#) and [Volusia](#) counties have created Trauma-Informed Learning Communities; and

Whereas, Multiple school districts across the State of Florida are partnering with the Florida Department of Education Multiagency Network for Students with Emotional/Behavioral Disabilities (SEDNET) program to assist in the provision of a quality system of care for students with or at-risk of emotional and/or behavioral disabilities; and

Whereas, Teachers, support staff, and administrators spend a large amount of time supporting, calming and disciplining these students thereby having less opportunity to work with other students; and

Whereas, Educators implementing trauma-sensitive practices are teaching social, emotional, non-cognitive, and resilience skills to all students in the school, thereby, moving from traditional discipline such as suspension and withholding recess, to [mindfulness and restorative practices](#); and,

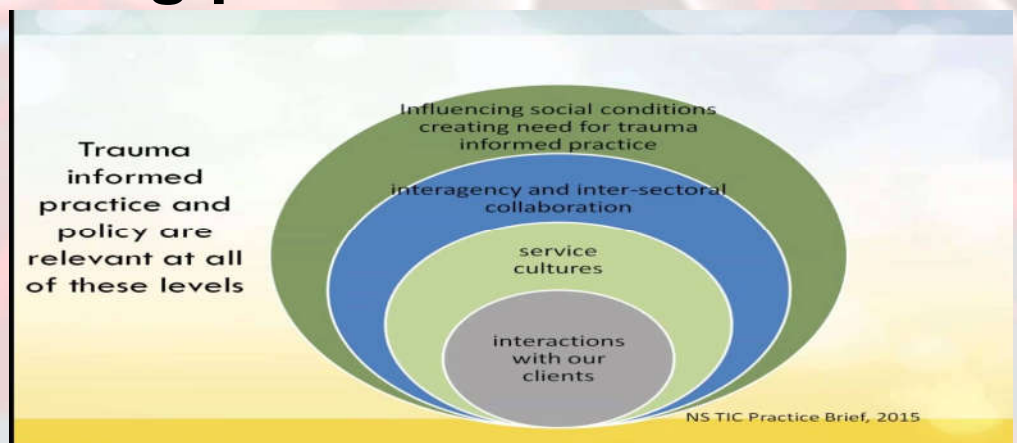
Whereas, Schools that have implemented trauma-sensitive practices are seeing significant results, including decreases in suspensions and office referrals and increases in attendance, student engagement, academic success and graduation; therefore be it



Trauma-Informed Care Learning Communities

RESOLVED, That the FMA recognizes that there is a significant relationship between cumulative Adverse Childhood Experiences and numerous health, social, and behavioral problems throughout a person's lifespan, including substance use disorders and premature death; and be it further

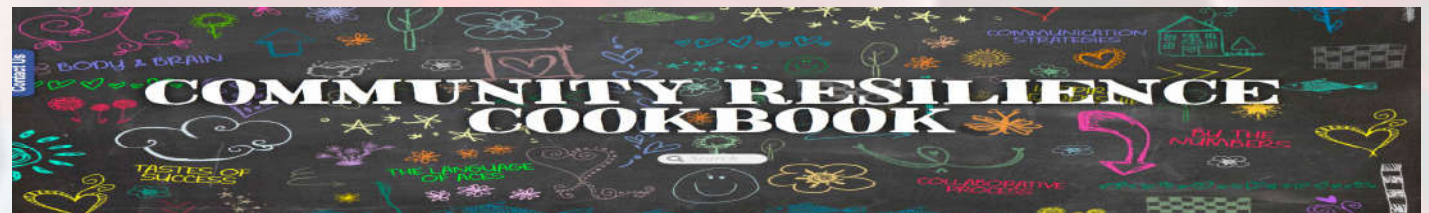
RESOLVED, That the FMA encourages communities in Florida to adopt the principles and practices of trauma-informed care learning prevention and intervention programs.



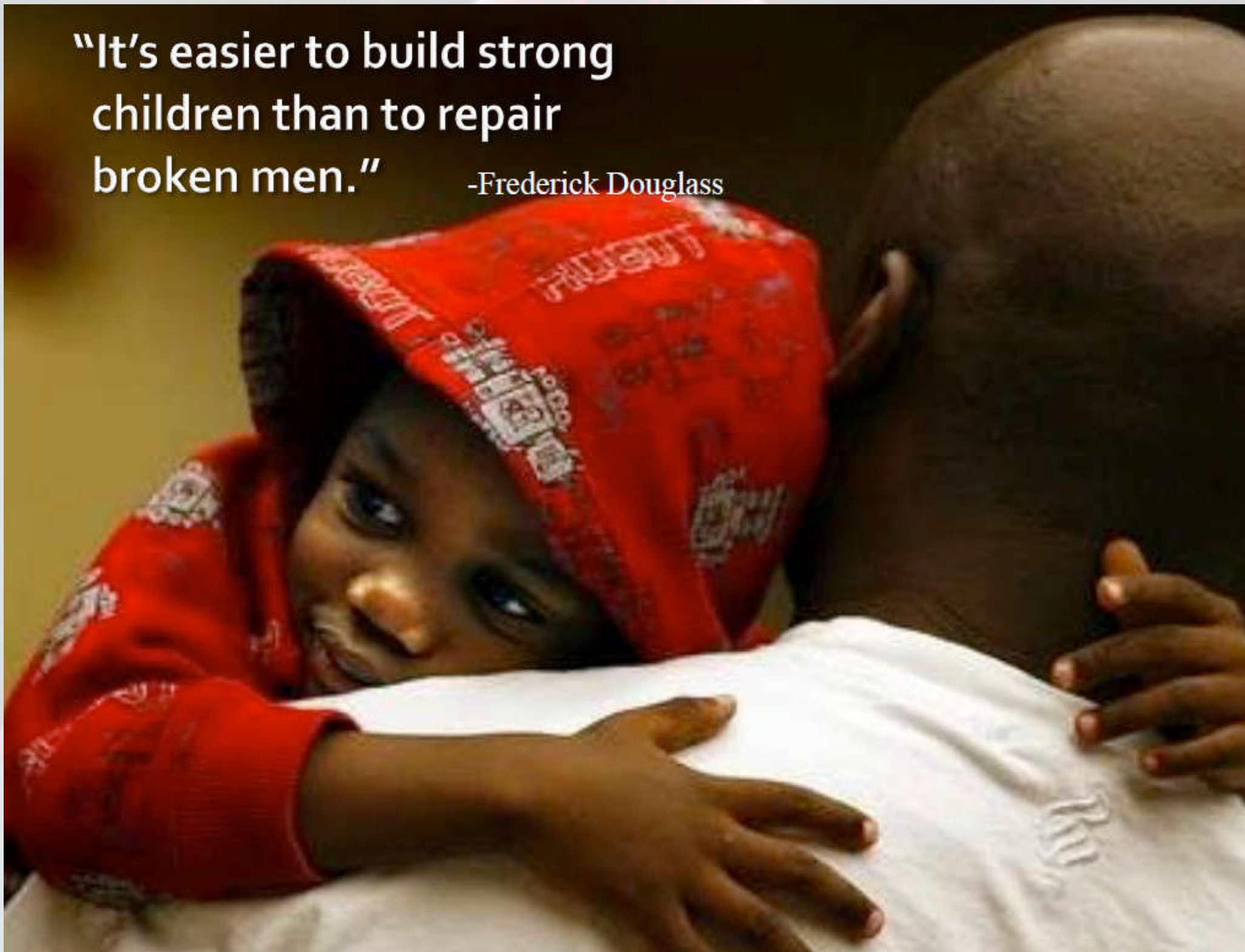
Trauma Informed Care Communities

2017 National Trauma-Informed Care Learning Community for behavioral health, social service, community and large system organizations:

- Create safe environments in which people can heal and learn
- Build community partnerships that support those you serve
- Implement trauma-informed best practices suited to the organizational environment
- Increase community awareness of trauma impact and trauma-informed care
- Address secondary traumatic stress/compassion fatigue among staff



**"It's easier to build strong
children than to repair
broken men."** -Frederick Douglass



Two Recent References

- **Policy statement:** Garner, Andrew S., Shonkoff, Jack P., Siegel, Benjamin S., Dobbins, Mary I., Earls, Marian F., McGuinn, Laura, ... & Wood, David L. (2012). Early Childhood Adversity, Toxic Stress, and the Role of the Pediatrician: Translating Developmental Science Into Lifelong Health. *Pediatrics*, 129 (1), 224-231.
- **Technical report:** Shonkoff, Jack P., Garner, Andrew S., Siegel, Benjamin S., Dobbins, Mary I., Earls, Marian F., McGuinn, Laura, ... & Wood, David L. (2012). The Lifelong Effects of Early Childhood Adversity and Toxic Stress. *Pediatrics*, 129 (1), 232-246.

More Resources...

AAP:

- <http://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/healthy-foster-care-america/Documents/Guide.pdf>

National Child Traumatic Stress Network:

- <http://www.nctsnet.org>

Harvard Center on the Developing Child:

- <http://developingchild.harvard.edu>

More Resources

- **Braverman, P & Barclay, C. Health disparities beginning in childhood: A life-course perspective. *Pediatrics*; 124:S163, 2009.**
- **Campbell et al., Early childhood investments significantly boost adult health, *Science*, 343 (6178): 1478-1485, March 28, 2014.**

More Resources

- **Felitti et al. Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults The Adverse Childhood Experiences (ACE) Study.**

[http://www.ajpmonline.org/article/S0749-3797\(98\)00017-8/pdf](http://www.ajpmonline.org/article/S0749-3797(98)00017-8/pdf)

- **Adverse Childhood Experiences (ACEs).**

<https://www.cdc.gov/violenceprevention/acestudy/index.html>

- **5 Things You Should Know About Stress.**

<https://www.nimh.nih.gov/health/publications/stress/index.shtml>

- **Coping With Stress.**

https://www.cdc.gov/violenceprevention/pub/coping_with_stress_tips.html

Questions?

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